## UK Patent Application (19) GB (11) 2 262 861(13) A

(43) Date of printing by UK Office 30.06.1993

- (21) Application No 9301628.5
- (22) Date of filing 26.07.1991
- (30) Priority data (31) 9017133 9103969
- (32) 04.08.1990 26.02.1991
- (33) GB
- (86) International application data PCT/GB91/01262 En 26.07.1991
- (87) International publication data WO92/03024 En 20.02.1992
- (71) Applicant The Secretary of State for Defence Defence Research Agency, Farnborough, Hants, GU14 7TU, United Kingdom
- (72) Inventor Kenneth Harry Heron
- (74) Agent and/or Address for Service R W Beckham Intellectual Property Department, Defence Research Agency, R69 Building, DRA Farnborough, Farnborough, Hants, GU14 6TD, United Kingdom

- (51) INT CL\* H04R 7/06 1/02
- (52) UK CL (Edition L) H4J JED J30F J30L J34F J34L J34M J34X
- (56) Documents cited by ISA GB 2023375 A GB 2010637 A GB 2115646 A FR 002408168 A US 3272281 A EP 0114910 A Journal of The Acoustical Society of America, Vol.72, No. 6, October 1982, pages 1863-1869 Journal of The Acoustical Society of America, Vol.73, No. 1, January 1983, pages 345-351
- (58) Field of search by ISA INT CL5 G10K, H04R

## (54) Panel-form loudspeaker

(57) A panel-form loudspeaker has a resonant multi-mode radiator panel which is excited at frequencies above the fundamental frequency and the coincidence frequency of the panel to provide high radiation efficiency through multi-modal motions within the panel, in contrast to the pistonic motions required of conventional loudspeakers. The radiator panel is a skinned composite with a honeycomb or similar core and must be such that it has a ratio of bending stiffness to the third power of panel mass per unit area (in mks units) of at least 10 and preferably at least 100. An aluminium skinned, aluminium honeycomb cored composite can meet this more severe criterion easily.

